IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	Evan E, Koslow	)	
Serial No:	10/666,878	)	GROUP ART UNIT: 1791
Filed:	September 19, 2003	)	EXAMINER: José A. Fortuna
For:	INTEGRATED PAPER COMPRISING FIBRILLATED FIBERS AND ACTIVE PARTICLES IMMOBILIZED THEREIN	)	DATE: April 7, 2008

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Commissioner for Patents
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BRIEF FOR APPELLANT

This is an appeal from the final rejection of the Examiner mailed October 16, 2007 rejecting claims 1-7, 9-12, 14, 16-20, 22, 24, and 42-47 which are all of claims of the subject application. A Notice of Appeal and the appeal fee were timely mailed and received in the United States Patent and Trademark Office on February 7, 2008. Please charge the Appeal fee of $510 to credit card for this brief and any over or under payment to Deposit Account No. 09-0456.

REAL PARTY IN INTEREST

The real party in interest is the assignee of all rights in this application, KX Technologies LLC, a corporation of the State of Connecticut, having a place of business at 269 South Lambert Road, Orange, Connecticut 06477.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to Appellants, Appellants' legal representatives, or assignee, which will directly affect, or be affected by, or have a bearing on the Board's decision on this appeal.

STATUS OF CLAIMS

The subject application was filed on September 19, 2003 with claims 1-40. During prosecution of the application, a Restriction Requirement Office Action was mailed March 15, 2005, restricting the claims to four groups, i.e., Group I, claims 1-25; Group II, claims 26-36; Group III, claim 37; and Group IV, claims 38-40, from which Appellants requested to elect claims 1-25 of Group I.

A Non-Final Office Action was mailed rejecting all elected claims 1-25 in the application, and withdrawing the non-elected claims 26-40. On November 4, 2005 Appellants responded with an amendment amending claims 1, 8, 11, 13 (as well as mistakenly labeling said claim as canceled), 15, 21, 23, 24, 25, canceling claims 26-40, and adding new claims 41-43. A Notice of Non-Compliant Amendment was mailed November 9, 2005 and a response to the Non-Compliant Office Communication was filed May 3, 2006 amending claims 1, 3, 4, 8, 9, 11, 13-15, 17, 20, 21, 23, 24, canceling 25-40 and adding new claims 41-43. A non-responsive Office Communication was then mailed on July 24, 2006, to which a Supplemental Amendment was filed on August 24, 2006 amending claims 1, 3, 4, 8, 9, 11, 13-15, 17, 20, 21, 23, 24, canceling 25-40 and adding new claims 41-43.

Responsive to the Supplemental Amendment filed August 24, 2006, a Final Rejection Office Action was mailed November 14, 2006, rejecting all the claims in the application, to wit, claims 1-24 and 41-43. An amendment in response to the Final Rejection was filed January 17, 2007 amending claims 8, 13, 14, 15, 21, 23, 24, and 41. An Advisory Action was mailed January 29, 2007 and a Request for Continued Examination filed March 14, 2007.

In response to the Request for Continued Examination, a Non-Final Office Action was mailed April 17, 2007 rejecting claims 1-24 and 41-43 in the application. An amendment filed August 1, 2007 amended claims 1, 9, 11, 14, 20, 24, 42 and 43, canceling claims 8, 13, 15, 21, 23 and 41, and adding new claims 44-47. A Final Rejection Office Action was mailed October 16, 2007 rejecting all the claims in the application, to wit, claims 1-7, 9-12, 14, 16-20, 22, 24, and 42-47. An Amendment After Final Rejection was filed on January 16, 2008.

An Advisory Action was mailed January 30, 2008 and a Notice of Appeal filed on February 7, 2008.

STATUS OF AMENDMENTS

No amendments have been filed after the Final Rejection and the rejected claims 1-7, 9-12, 14, 16-20, 22, 24, and 42-47, as they presently stand, are set forth in the Appendix.

SUMMARY OF CLAIMED SUBJECT MATTER

The invention of independent claim 1 is directed to an integrated paper having active particles immobilized therein. The integrated paper includes a plurality of fibrillated fibers, active agents and a microbiological interception enhancing agent on at least a portion of at least some of the fibrillated fibers and/or active agents, wherein the integrated paper has a mean pore size of less than or equal to about 2 microns. Specification, pg. 1, ll. 15-19 and 29-30; pg. 4, l. 29 to pg. 6, l. 8. The plurality of fibrillated fibers are fibrillated at a temperature greater than about 30°C and have an average fiber diameter of less than about 1000 nm. Specification, pg. 1, ll. 15-19; pg. 6, l. 10 to pg. 7, l. 23. The active agents may include metals, metal salts, metal oxides, alumina, carbon, activated carbon, silicates, ceramics, zeolites, diatomaceous earth, activated bauxite, fuller's earth, calcium sulfate, titanium dioxide, magnesia, magnesium hydroxide, magnesium oxide, manganese oxides, iron oxides, perlite, talc, clay, bone char, calcium hydroxide, calcium salts, or combinations thereof. Specification, pg. 1, ll. 19-24; pg. 7, l. 24 to pg. 8, l. 6. The microbiological interception enhancing agent is a biologically active metal precipitated with a counter ion of a cationic material that is residing on at least portion of the fibrillated fibers and/or active agents to form a colloidal metal precipitate on a surface of such portions of fibrillated fibers and/or active agents. See, Specification, pg. 13 l. 1 to pg. 17, l. 13, and in particular, pg. 13, ll. 8-10, pg. 14, ll. 5-8, pg. 15, ll. 10-21, pg. 16, ll. 18-20.

Referring to independent claim 9, an integrated paper of the invention includes a plurality of fibrillated fibers, wherein these fibers have been fibrillated at a temperature greater than about 30°C and have an average fiber diameter of less than

about 400 nm. Specification, pg. 1, ll. 15-19 and pg. 6, l. 10 to pg. 7, l. 23. Silver oxide particles are admixed with the fibrillated fibers. Specification, pg. 2, ll. 1-6 and pg. 8, ll. 7-15. This paper also includes the microbiological interception enhancing agent on at least a portion of at least some of the fibrillated fibers, whereby the enhancing agent is a biologically active metal precipitated with a counter ion of a cationic material that is residing on those portions of the fibrillated fibers to form a colloidal metal precipitate on a surface of such portions of fibers. See, Specification, pg. 13 l. 1 to pg. 17, l. 13, and in particular, pg. 13, ll. 8-10, pg. 14, ll. 5-8, pg. 15, ll. 10-21, pg. 16, ll. 18-20.

As recited in independent claim 11, another integrated paper of the invention includes a plurality of fibrillated fibers, again as discussed with respect to claim 1, wherein these fibers have been fibrillated at a temperature greater than about 30°C and have an average fiber diameter of less than about 400 nm. Specification, pg. 1, ll. 15-19 and pg. 6, l. 10 to pg. 7, l. 23. The microbiological interception enhancing agent as discussed in relation to claim 1 and 9 is on at least a portion of at least some of these fibrillated fibers. Specification, pg. 13 l. 1 to pg. 17, l. 13, and in particular, pg. 13, ll. 8-10, pg. 14, ll. 5-8, pg. 15, ll. 10-21, pg. 16, ll. 18-20. The integrated paper also includes one or more acid neutralizing agents admixed with the fibrillated fibers, wherein the integrated paper can withstand a hot and corrosive environment of a lube oil filter. These one or more acid-neutralizing agents may include magnesium oxide, magnesium hydroxide, calcium sulfonate, magnesium sulfonate, calcium phenate, magnesium phenate, or combinations thereof. Specification, pg. 2, ll. 7-16 and pg. 8, ll. 16-23, and pg. 22, l. 26 to pg. 27, l. 8.

Independent claim 14 is directed to an integrated paper having a plurality of lyocell fibers fibrillated at a temperature greater than about 30°C, wherein the fibrillated lyocell fibers have an average fiber diameter of less than or equal to about 400 nm, and activated carbon particles admixed with the fibrillated lyocell fibers. The integrated paper has a mean flow path of less than about 2 microns. Specification, pg. 2, ll. 17-26, and pg. 6, l. 25 to pg. 7, l. 5 and ll. 24-25. A microbiological interception enhancing agent is on at least a portion of at least some of the fibrillated lyocell fibers to form a colloidal metal precipitate on a surface of the at least portion of the fibrillated lyocell fibers. Specification, pg. 13 l. 1 to pg. 17, l. 13, and in particular, pg. 13, ll. 8-10, pg. 14, ll. 5-8, pg. 15, ll. 10-21, pg. 16, ll. 18-20.

As another integrated paper of the invention, independent claim 20 is directed to an integrated paper of a plurality of fibers having an average fiber diameter of less than about 1000 nm, a lead reducing agent admixed with the plurality of fibers, and a microbiological interception enhancing agent on at least a portion of at least some of the fibers. The integrated paper has a mean flow path of less than about 2 microns. Specification, pg. 2, l. 27 to pg. 3, l. 2, and pg. 8, l. 24 to pg. 9, l. 6. Again, the microbiological interception enhancing agent is a biologically active metal precipitated with a counter ion of a cationic material that is residing on at least portion of the fibers to form a colloidal metal precipitate on a surface thereof. Specification, pg. 13 l. 1 to pg. 17, l. 13, and in particular, pg. 13, ll. 8-10, pg. 14, ll. 5-8, pg. 15, ll. 10-21, pg. 16, ll. 18-20.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Pursuant to the Final Rejection Office Action mailed October 16, 2007, the issues on appeal are the final rejection of claims 1-7, 9-12, 14, 16-20, 22, 24 and 42-47 under 35 USC §103(a) over Giglia et al. (U.S. 4,929,502) in view of Sawan et al. (U.S. 5,817,325) for the reasons set forth in the Office Action mailed April 17, 2007. The rejection under 35 USC §112 in the Final Rejection has been overcome, and as such, is not at issue in this appeal.

ARGUMENT

Claims 1-7, 9-12, 14, 16-20, 22, 24 and 42-47 stand finally rejected under 35 USC §103(a) as anticipated by Giglia et al. U.S. 4,929,502 in view of Sawan et al. U.S. 5,817,325.

Appellants submit that independent claim 1 is directed to an integrated paper having a mean pore size of less than or equal to about 2 microns comprising a plurality of fibrillated fibers, active agents and a microbiological interception enhancing agent on at least a portion of at least some of the fibrillated fibers and/or active agents. The fibrillated fibers have been fibrillated at a temperature greater than about 30°C and have an average fiber diameter of less than about 1000 nm. The active agents may include metals, metal salts, metal oxides, alumina, carbon, activated carbon, silicates, ceramics, zeolites, diatomaceous earth, activated bauxite, fuller's earth, calcium sulfate, titanium dioxide, magnesia, magnesium hydroxide, magnesium oxide, manganese oxides, iron oxides, perlite, talc, clay, bone char, calcium hydroxide, calcium salts, or combinations thereof.

Independent claim 9 is directed to an integrated paper having a plurality of fibrillated fibers with an average fiber diameter of less than about 400 nm, silver oxide particles admixed with the fibrillated fibers, and the present microbiological interception enhancing agent on at least a portion of at least some of the fibrillated fibers.

In accordance with independent claim 11, the integrated paper includes a plurality of fibrillated fibers with an average fiber diameter of less than about 400 nm, one or more acid neutralizing agents admixed with the fibrillated fibers, and the present microbiological interception enhancing agent on at least a portion of at least some of the fibrillated fibers. This integrated paper can withstand a hot and corrosive environment of a lube oil filter, and wherein the one or more acid neutralizing agents comprises magnesium oxide, magnesium hydroxide, calcium sulfonate, magnesium sulfonate, calcium phenate, magnesium phenate, or combinations thereof.

As is recited in independent claim 14, the present integrated paper includes a plurality of fibrillated lyocell fibers having an average fiber diameter of less than or equal to about 400 nm, activated carbon particles admixed with the fibrillated lyocell fibers, and the microbiological interception enhancing agent of the invention on at least a portion of at least some of the fibrillated lyocell fibers.

Independent claim 9 is directed to an integrated paper of a plurality of fibers having an average fiber diameter of less than about 1000 nm, a lead reducing agent admixed with the plurality of fibers, and the present microbiological interception enhancing agent on at least a portion of at least some of the fibrillated fibers.

An essential feature of Appellant's invention, and as is claimed in all of the currently pending claims, is that the microbiological interception enhancing agent is a

biologically active metal precipitated with a counter ion of a cationic material residing on at least portion of the fibrillated fibers and/or active agents to form a colloidal metal precipitate on a surface of only these portions of the fibers and/or active agents where the cationic material resides. That is, it is only selected fibers and/or active agents that have the microbiological interception enhancing agent of the invention on portions thereof. As such, when the fibers and/or active agents, including the selected fibers and/or active agents that have been treated with the present microbiological interception enhancing, are formed into an integrated paper, the microbiological interception enhancing agent of the invention is integrated into the paper itself, and does not just reside as a surface coating/layer on a substrate surface.

The final integrated paper product of the invention is better understood in accordance with the description of the method of making the integrated paper as described in the present application. Specification, pg. 17, l. 14 to pg. 20, l. 19. In particular, a slurry of fibrillated fibers and/or active agents are treated with a microbiological interception enhancing agent by coating at least a portion of the surface of at least some of the fibers and/or active agents with a cationic material to impart a charged counter-ion thereon, followed by rinsing the treated pulp with nearly ion-free water to tightly draw the counter-ions against the treated surface. Specification, pg. 17, l. 15 to pg. 19, l. 23 and pg. 20, ll. 9-19. A metal salt solution is provided to the mixture, whereby the metal salt reacts with the counter-ion to precipitate a colloidal metal precipitate adjacent the cationic material residing on the portion of the selected fibers and/or active agents. The solution is then partially dewatered, rinsed, and sent to pulp preparation systems to form the final integrated paper. Specification, pg. 19, l. 24 to pg. 20, l. 19. As such, the present microbiological interception

enhancing agent is integrated into the final integrated paper product of the invention, and does not just reside as a surface coating/layer on its surface.

Appellants disagree with the final rejection of all of the pending claims over Giglia et al. U.S. 4,929,502 (hereinafter referred to as "Giglia") in view of Sawan et al. U.S. 5,817,325 (hereinafter referred to as "Sawan").

Appellants submit that the cited Giglia patent is limited to fibrillated fiber precursors that are defined by their Canadian Standard Freeness in combination with their Tensile Strength when formed into a sheet. Giglia , Abstract. The fibers can be used to make fabrics that comprise the fibrillated fiber alone or in combination with a toxic absorbing agent or filtration material, which may include activated carbon fibers or powders. Giglia, Col. 6, ll. 33-37. However, as has been recognized by the Examiner, Giglia does not teach having a microbial interception enhancing agent on selected fibers. To overcome this deficiency, the Examiner cites Sawan stating that it teaches the same interception enhancing agent as Appellant's invention.

It is Appellant's position that Sawan does not disclose or contemplate an integrated paper having within/throughout such paper a microbiological interception enhancing agent that is residing on portions of selected fibers and/or active agents of such integrated paper. Rather, appellants continue to submit that Sawan is limited to a contact-killing, non-leaching antimicrobial coating on a surface of an article of manufacture, whereby the coating includes an organic matrix immobilized on such surface with an antimicrobial metallic material bound or complexed to the organic matrix. Sawan, Abstract, col. 2, ll. 20-25 and claim 1. That is, this coating only

includes the organic material (which may be a polycationic material) in combination with the metallic material to form antimicrobial coatings or films.

Unlike that of the present invention, Sawan does not disclose or suggest that its organic material resides on a surface of portions of selected fibers/active agents, such that, when in contact with the metallic material causes preferential precipitation of the metallic material with cations of the organic to form a colloidal metal precipitate on the surface of only those portions of the fibers/active agents where the organic material resides. As such, Sawan also does not disclose or suggest that these fibers, active agents and microbiological interception enhancing agent are then formed into an integrated paper, such that, the microbiological interception enhancing agent is integrated into the paper itself. Sawan does disclose that its antimicrobial coatings or films can be applied to a variety of substrates, including paper. However, in so doing, the antimicrobial coatings would reside on a surface of the paper, such that, its antimicrobial metallic material would not and does not reside or is integrated within the paper itself. Rather, it is simply another layer on top of the substrate (e.g., paper), as compared to appellants invention which is a paper having integrated into such paper the present microbiological interception enhancing agent, such that, the final product is a single layer or a single sheet of paper, not a paper with a coating or film on a surface thereof as is disclosed in Sawan.

In view of the foregoing and for the reasons discussed in more detail below, Appellants submit that the present claimed precipitation forms a final integrated paper product that is different from the products formed by Sawan. Again, the present invention has a microbiological interception enhancing agent directly integrated into and throughout the final end product, as compared to the end product of Sawan which

would merely provide additional layering of a contact-killing, non-leaching antimicrobial coating on a surface of an article of manufacture.

To further support Appellants position, which is contrary to the Examiner's interpretation, it is submitted that Sawan is replete with disclosure that is limited to organic matrices that have been treated with a biocidal liquid to form antimicrobial coatings and films that may be applied directly to a wide range of surfaces. Sawan, Col. 4, ll. 33-41; col. 8, ll. 41-43; col. 9, ll. 44-46; and col. 11, ll. 14-19. As is disclosed in Sawan, its antimicrobial materials are either a contact-killing antimicrobial coating on a surface of a substrate, cast into a freestanding antimicrobial film, or incorporated into a carrier to provide a bulk antimicrobial which can be applied as desired to form a contact-killing antimicrobial layer. Sawan, Col. 2, ll. 26-31.

The Examiner states that while coating the microbiological interception agent onto a substrate is a preferred embodiment, Sawan also teaches adding the interception agent either by producing it, i.e., making it first, and then adding to the substrate or can be formed in situ in the substrate, citing, for example, column 4, lines 3-10. However, none of the approaches of Sawan disclose, contemplate or suggest that its organic material resides on a surface of portions of selected fibers/active agents, whereby its antimicrobial metallic material reacts with cations of the organic to form a colloidal metal precipitate on the surface of only those portions of the fibers/active agents where the organic material resides, as is currently claimed.

Sawan is limited to antimicrobial coatings or films that include an organic matrix that reversibly binds or complexes with a biocide that is intercalated within the matrix, whereby the organic material penetrates a portion of a microorganism's cell membrane to permit insinuation of the biocide into the microorganism. Sawan, Col. 2, l. 46 to col.

3, l. 10. The organic material may also be crosslinked to form the matrix (Sawan, col. 3, ll. 30-44) so that the biocidal material non-leachably binds to or complexes with the organic matrix (Sawan, col. 3, ll. 45-67).

Sawan also teaches liquid compositions for forming a contact killing, non-leaching antimicrobial layer or coating on a surface. Sawan, Col. 4, l. 1-2. These liquid compositions may include first and second liquids or dispersions of an organic liquid (optionally with a crosslinking agent) and a biocidal liquid. In forming this antimicrobial coating, the organic liquid (and optionally the crosslinking agent) is applied to the substrate to form an organic matrix thereon by any suitable means for applying a liquid coating (Sawan, col. 4, ll. 56-59) (optionally the matrix may be cured if the crosslinking agent is present). This matrix is then contacted with the biocidal liquid so that the biocidal material is deposited into the matrix such that the biocidal material becomes attached to or associated with the matrix. Sawan, Col. 4, ll. 3-19 and ll. 33-67 and col. 5, ll. 3-7. Alternatively, the liquid composition may include the organic liquid, biocidal liquid and optionally a crosslinking agent, all within a single solution, which is applied to the substrate to form the contact-killing coating thereon. Sawan, Col. 4, ll. 20-28 and col. 5, ll. 8-20.

As another embodiment, Sawan teaches that the two-part or one-part compositions described above having the organic liquid (optionally with a crosslinking agent) and the biocidal liquid may be cast to form a freestanding antimicrobial film that is used as desired. In so doing, the organic liquid is formed into a film on a substrate, is contacted with the biocidal liquid to deposit the biocidal material within the matrix of organic material, and is then removed from the substrate to form the freestanding antimicrobial film. Sawan, Col. 5, ll. 37-59. These freestanding films may be ground

into a powder, which may be incorporated into a carrier, such as a gel, cream or liquid, and applied to a surface to form an antimicrobial layer, or dissolved/dispersed in a carrier or vehicle which can be spread, sprayed, wiped or applied in some other manner to form a contact killing antimicrobial layer on a surface or to kill microbes on the surface, or the powder can even be cast or molded. Sawan, Col. 5, l. 60 to col. 6, l. 10.

Again, none of the approaches of Sawan disclose, contemplate or suggest that its organic material resides on a surface of portions of selected fibers/active agents, whereby its antimicrobial metallic material reacts with cations of the organic material to form a colloidal metal precipitate on the surface of only those portions of the selected fibers/active agents, as is currently claimed. While Appellants understand that a reference is not limited to its preferred embodiment, there still must be a suggestion or contemplation that the organic material can reside on a portion of a surface of selected fibers and/or active agents so that an antimicrobial metal can react with a cation of such organic material to form a colloidal metal precipitate only those portions of the selected fibers/active agents, whereby these fibers, active agents and antimicrobial (colloidal metal precipitate) can formed into an end-product, preferably a paper. In considering Sawan as a whole, Appellants submit that there is no such disclosure, suggestion or contemplation in Sawan.

Bearing the foregoing in mind, if one were to combine the teachings of Giglia and Sawan, the antimicrobial coatings or films of Sawan would be applied to the filter medium of Giglia to form an additional layer thereon such filter medium. That is, the filter medium of Giglia would not include fibers and/or active agents having a microbiological interception enhancing agent on at least a portion of at least some of

such fibers and/or active agents, whereby the microbiological interception enhancing agent comprises a biologically active metal precipitated with a counter ion of a cationic material that is residing on such portion to form a colloidal metal precipitate.

In accordance with Appellant's invention, the precipitation of the biologically active metal with the counter ion of the cationic material enables controlled precipitation and formation of the colloidal metal precipitate. In so doing, since the cationic material is on some of the fibers of the paper, the colloidal metal precipitate is integrated directly in the paper itself, i.e., it is not merely a coating, film or additional layering on the paper.

Further, the Examiner states that the precipitation of additives onto papermaking fibers is well known in the art (it is called fiber loading), and therefore, loading the fibers with an antimicrobial intercepting agent would have been obvious to one of ordinary skill in the art, therein citing ***KSR Int'l Co. v. Teleflex Inc.***, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007). However, Appellant points out that Fiber Loading is a well known method for manufacturing precipitated calcium carbonate directly within the pulp process for making stronger paper, as is evidenced by the references cited by the Examiner in the Advisory Action. This process would not make it obvious to one skilled in the art at the time of the invention to provide an integrated paper having within/throughout such paper a microbiological interception enhancing agent that is residing on portions of selected fibers and/or active agents of such integrated paper. It is submitted that the present invention of providing an antimicrobial intercepting agent on selected fibers and/or active agents for making a paper that has increased antimicrobial properties is not just the "predictable use of

prior art elements according to their established functions." Id. at 1740, 82 USPQ2d at 1396.

Appellants submit that neither Giglia nor Sawan, nor paper loading, contemplates or suggests that a microbiological interception enhancing agent can reside on portions of some (i.e., selected) fibers and/or active agents for forming an integrated paper so that the microbiological interception enhancing agent is integrated into the paper itself. It is only Appellant's disclosure that teaches these limitations, which of course, is improper as a hindsight reconstruction of Appellant's invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983) (Hindsight based on reading of the patent in issue may not be used to aid in determining obviousness). The cited references, and not in retrospect, must suggest doing what Appellant has done. *In re Skoll* (CCPA 1975) 187 USPQ 481. Likewise, hindsight and the level of ordinary skill in the art may not be used to supply a component missing from the prior art references. *Al-Site Corp. v. VSI International, Inc.*, 174 F.3d 1308, 1324, 50 USPQ2d 1161, 1171 (Fed. Cir. 1999).

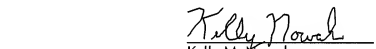
In view of the foregoing, and under the applicable patent law in this area, Appellants submit that the claimed integrated papers of the invention are distinct and novel over the prior art of record, and as such, the pending claims are properly allowable under 35 USC 103.

SUMMARY

It is respectfully submitted that the prior art does not disclose nor teach Appellant's invention under 35 USC 103.

Accordingly, for the reasons given above, Appellant respectfully submits that the claimed invention, as a whole, is not obvious over the cited prior art and that claims 1-7, 9-12, 14, 16-20, 22, 24, and 42-47 are patentable. The Final Rejection should be reversed and the claims should be allowed to issue.

Respectfully submitted,



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Pending Claims of U.S. Serial No. 10/666,878

1. (Previously presented) An integrated paper having active particles immobilized therein, said integrated paper comprising of:

a plurality of fibers fibrillated at a temperature greater than about 30°C, wherein said fibrillated fibers have an average fiber diameter of less than about 1000 nm;

active agents selected from the group consisting of metals, metal salts, metal oxides, alumina, carbon, activated carbon, silicates, ceramics, zeolites, diatomaceous earth, activated bauxite, fuller's earth, calcium sulfate, titanium dioxide, magnesia, magnesium hydroxide, magnesium oxide, manganese oxides, iron oxides, perlite, talc, clay, bone char, calcium hydroxide, calcium salts, or combinations thereof; and

a microbiological interception enhancing agent on at least a portion of at least some of said fibrillated fibers and/or said active agents, said microbiological interception enhancing agent comprising a biologically active metal precipitated with a counter ion of a cationic material that is residing on said at least portion of said fibrillated fibers and/or said active agents to form a colloidal metal precipitate on a surface of said at least portion of said fibrillated fibers and/or said active agents,

wherein said integrated paper has a mean pore size of less than or equal to about 2 microns.

2. (Original) An integrated paper of claim 1 wherein said fibrillated fibers comprise Lyocell.

3. (Previously presented) An integrated paper of claim 2 wherein the lyocell has an average fiber diameter of less than about 400 nm.

4. (Previously presented) An integrated paper of claim 1 wherein said active agents have an average particle size of less than or equal to about 1 micron to about 5000 microns.

5. (Original) An integrated paper of claim 1 wherein the average diameter of said fibrillated fibers is less than an average particle size of said active agents.

6. (Original) An integrated paper of claim 1 further including binder fibers or particles.

7. (Original) An integrated paper of claim 1 wherein said fibrillated fibers and said active agents have different settling velocities such that said integrated paper has an asymmetric structure when formed by wet-laid processes.

8. (Cancelled)

9. (Previously presented) An integrated paper comprising of:

a plurality of fibers fibrillated at a temperature greater than about 30°C, wherein said fibrillated fibers have an average fiber diameter of less than about 400 nm;

silver oxide particles admixed with said fibrillated fibers; and

a microbiological interception enhancing agent on at least a portion of at least some of said fibrillated fibers, said microbiological interception enhancing agent comprising a biologically active metal precipitated with a counter ion of a cationic material that is residing on said at least portion of said fibrillated fibers to form a colloidal metal precipitate on a surface of said at least portion of said fibrillated fibers.

10. (Original) An integrated paper of claim 9 wherein the fibrillated fibers comprise a liquid crystal polymer.

11. (Previously presented) An integrated paper comprising of:

a plurality of fibers fibrillated at a temperature greater than about 30°C, wherein said fibers have an average fiber diameter of less than about 400 nm;

a microbiological interception enhancing agent on at least a portion of at least some of said fibrillated fibers, said microbiological interception enhancing agent comprising a biologically active metal precipitated with a counter ion of a cationic material that is residing on said at least portion of said fibrillated fibers to form a colloidal metal precipitate on a surface of said at least portion of said fibrillated fibers; and

one or more acid neutralizing agents admixed with said fibrillated fibers;

wherein said integrated paper can withstand a hot and corrosive environment of a lube oil filter, and wherein said one or more acid neutralizing agents comprises magnesium oxide, magnesium hydroxide, calcium sulfonate, magnesium sulfonate, calcium phenate, magnesium phenate, or combinations thereof.

12. (Original) An integrated paper of claim 11 further including binder fibers or particles.

13. (Cancelled)

14. (Previously presented) An integrated paper comprising of:

a plurality of lyocell fibers fibrillated at a temperature greater than about 30°C, wherein said fibrillated lyocell fibers have an average fiber diameter of less than or equal to about 400 nm;

activated carbon particles admixed with said fibrillated lyocell fibers, wherein said integrated paper has a mean flow path of less than about 2 microns; and

a microbiological interception enhancing agent on at least a portion of at least some of said fibrillated lyocell fibers, said microbiological interception enhancing agent comprising a biologically active metal precipitated with a counter ion of a cationic material that is residing on said at least portion of said fibrillated lyocell fibers to form a colloidal metal precipitate on a surface of said at least portion of said fibrillated lyocell fibers.

15. (Cancelled)

16. (Original) An integrated paper of claim 14 further including a heavy metal reducing agent.

17. (Previously presented) An integrated paper of claim 16 wherein the heavy metal reducing agent comprises particles of zeolite, silicate, or combinations thereof.

18. Original) An integrated paper of claim 14 further including an arsenic reducing agent.

19. (Original) An integrated paper of claim 18 wherein the arsenic reducing agent comprises particles of iron, oxides of manganese or iron, or combinations thereof.

20. (Previously presented) An integrated paper comprising:

a plurality of fibers having an average fiber diameter of less than about 1000 nm;

a lead reducing agent admixed with said plurality of fibers; and

a microbiological interception enhancing agent on at least a portion of at least some of said fibers, said microbiological interception enhancing agent comprising a biologically active metal precipitated with a counter ion of a cationic material that is residing on said at least portion of said fibers to form a colloidal metal precipitate on a surface of said at least portion of said fibers,

wherein said integrated paper has a mean flow path of less than about 2 microns.

21. (Cancelled)

22. (Original) An integrated paper of claim 20 further including binder fibers or particles.

23. (Cancelled)

24. (Previously presented) An integrated paper of claim 20 further including a carbon block, wherein said integrated paper is wrapped around the carbon block.

25-40. (Cancelled)

41. (Cancelled)

42. (Previously presented) The integrated paper of claim 1 wherein said colloidal metal precipitate includes a silver-amine-halide complex.

43. (Previously presented) The integrated paper of claim 1 wherein said fibrillated fibers have an average diameter of less than or equal to 250 nm and a length of 1mm to about 8 mm.

44. (Previously presented) The integrated paper of claim 1 wherein said colloidal metal precipitate is physically trapped within a matrix of said cationic material.

45. (Previously presented) The integrated paper of claim 1 wherein said colloidal metal precipitate is bound to said cationic material.

46. (Previously presented) The integrated paper of claim 45 wherein said colloidal metal precipitate is bound to said cationic material by adsorption.

47. (Previously presented) The integrated paper of claim 45 wherein said colloidal metal precipitate is bound to said cationic material by electrostatic forces.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None